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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,450	11/20/2001	Yuichi Takamine	36856.571	8189

7590 03/03/2003

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 03/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/991,450

Applicant(s)

Takamine

Examiner

Boulara Summons

Group Art Unit

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— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

3 (three)

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☐ Responsive to communication(s) filed on _____
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-18 is/are pending in the application.
- ☐ Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-14 and 16-18 is/are rejected.
- ☒ Claim(s) 15 is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☒ The drawing(s) filed on 11/20/01 is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☒ All ☐ Some* ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

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DETAILED ACTION

Drawings

1. Figures 3, 4 and 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (see page 10, the last two lines thereof through page 11, line 4 and page 12, lines 1-2). See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-6 are rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: there is no recited cooperative relationship of the elements of the “balanced-to-unbalanced conversion function” and the “plurality of IDTs”, rendering unclear how the plurality of IDTs perform the balanced-to-unbalanced conversion function.

4. Claim 2 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation “said balanced signal terminals” in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Additionally, it is unclear whether the

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IDT that is connected to the “balanced signal terminals” is one IDT (e.g. the middle IDT in Fig. 1) or more than one IDT (e.g. the outermost IDTs in Fig. 6), so it cannot be determined which IDTs must have “an even number of electrode fingers” (claim 2, Ins. 3-4).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nagatsuka et al. JP 2000-151337.

Fig. 1 of Nagatsuka et al. discloses a surface acoustic wave (SAW) filter comprising: a piezoelectric substrate 5; a plurality of IDTs 1, 2, and 3; an unbalanced terminal 6 and balanced terminals 7; and the two IDTs 2 and 3 located on the opposite sides of the central IDT 1 are disposed in “approximate point-symmetry” (i.e. vertically reversed as IDTs 204 and 206 in Applicant’s Fig. 1)[see Nagatsuka sections [0014] and [0024] of the provided machine translation) about the center IDT1. It should be noted that the positional point-symmetrical locations of the two outside IDTs is not considered to have anything to do with their electrical connections as far as the recited limitations of claim 1 are concerned.

Regarding claims 5 and 6, reflectors 4 are shown, and the filter is disclosed as used in a communication device (see section [0001]).

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7. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nakazawa et al. JP 11-97966.

Fig. 1 of Nakazawa et al. discloses a SAW filter comprising: a piezoelectric substrate (not shown); a plurality of IDTs (11,12,13) with reflectors 14 placed at the outside thereof; an unbalanced terminal 17 and balanced terminals 15 and 16; and the two IDTs 12 and 13 located on the opposite sides of the central IDT 11 are disposed in “approximate point-symmetry” (i.e. vertically reversed)[see also the abstract, lns. 9-11]. Regarding claim 2, due to the division of the central IDT 11, connected to the balanced signal terminals 15 and 16, into two parts, the IDT 11 must have an even number of electrode fingers. Regarding claims 4 and 6, see Fig. 2 and section [0006], respectively.

8. Claims 1, 5, and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Taguchi et al. EP 0 800 270 A2.

Fig. 5 of Taguchi et al. discloses a SAW filter comprising: a piezoelectric substrate (not shown (see col. 6, lns. 7-8); a plurality of IDTs with reflectors 503-1 and 503-2 placed at the outside; an unbalanced terminal 504 and balanced terminals 505-1 and 505-2; and the two IDTs 502-1 and 502-2 located on opposite sides of the central IDT 501 are disposed in “approximate point-symmetry” (i.e. vertically reversed as are IDTs 204 and 206 in Applicant’s Fig. 1)[see also col. 6, lns. 18-39]. Regarding claim 6, see col. 4, lns. 36-40.

9. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kawakatsu et al. U.S. 5,568,002.

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Fig. 1B of Kawakatsu et al. discloses a SAW filter comprising: a piezoelectric substrate 40; a plurality of IDTs 44-46 with reflectors 42 and 43 placed at the outside thereof; an unbalanced terminal connected to 45b and two balanced terminals 48a and 48b; and the two IDTs 44 and 46 located on opposite sides of the central IDT 45 are disposed in "approximate point-symmetry" (see Kawakatsu et al. Fig. 1B verses the prior art Fig. 8; and IDTs 204 and 206 in Applicants Fig. 1); and wherein the two outer IDTs 44 and 46 connected to the balanced terminals have an even number of electrode fingers (six shown in the Figs.). Regarding claims 4 and 6, see Fig. 2 wherein the filter is series connected to another SAW resonator filter to create a communication device comprising the first filter.

10. Claims 7, 8, 10-14, and 16-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ueda et al. 6,111,481.

Regarding claim 13, Fig. 18 of Ueda et al. discloses a SAW filter (i.e. the lower filter 21) comprising: a piezoelectric substrate (not shown, see e.g. col. 3, ln. 45-48); first, second and third IDTs (21A, 21B, 21C, respectively); an unbalanced signal terminal connected to the second IDT 21B [at bus bar (21B)₁]; first and second balanced signal terminals out1 and out2 each connected to the first and third IDTs 21A and 21C; the IDTs each having first and second end portions at opposite ends thereof in a direction perpendicular to the propagation direction of the SAWs; the first end portion (21A)₂ of the first IDT 21A and the second end portion (21C)₂ of the third IDT 21C each electrically connected to a first balanced signal terminal out1; and the second end portion (21A)₁ of the first IDT 21A and the first end portion (21C)₁ of the third IDT 21C each electrically connected to a second balanced signal terminal out2. Note that the claim does

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not specify that the first ends or second ends of all of the IDTs must be aligned. Therefore, the Examiner may arbitrarily call either end of each IDT the "first end portion" and the other end the "second end portion", so that in some IDTs the first end portion is toward the top of the figure and in some IDTs the first end portion is toward the bottom of the figure.

Regarding claim 7, Fig. 20 of Ueda et al. discloses a SAW filter (lower filter 21) comprising the first, second, and third IDTs; an unbalanced signal terminal connected to the first and third IDTs 21A and 21C (i.e. from the node at Z_2); first and second balanced signal terminals out1 and out2 each connected to opposite ends of the second IDT 21B; the first end portion $(21A)_1$ of the first IDT 21A and the second end portion $(21C)_1$ of the third IDT 21C each being electrically connected to the unbalanced signal terminal (from node Z_2); and the second end portion $(21A)_2$ of the first IDT 21A and the first end portion $(21C)_2$ of the third IDT 21C being each connected to a ground potential.

Regarding claims 8 and 14, because the IDTs all have a whole number of electrode finger pairs N (see e.g. col. 14, lns. 44-46 and col. 9, lns. 53-57), they must all have an even number of electrode fingers. Regarding claims 10 and 16, another SAW resonator filter 11 is connected in series with the SAW filter 21. Regarding claims 11, 12, 17 and 18, filter 21 has reflectors 20A and 20B, and is used in a communication device (see col. 1, lns. 16-20).

11. Claims 7 and 9-12 are rejected under 35 U.S.C. § 102(a) as being anticipated by Mita et al. JP 2001-292050.

Fig. 1 of Mita et al. discloses a SAW filter 15 comprising: a piezoelectric substrate 10; first, second and third IDTs 12, 11 and 13 with reflectors 14 at the outside thereof; an

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unbalanced signal terminal 17 connected to a first end portion (lower end) of the first IDT 12 and a second end portion (lower end) of the third IDT 13, with the second upper/end portion of the first IDT 12 and the first/upper end portion of the third IDT 13 being connected to ground; and balanced signal terminals 16a and 16b connected to the opposite ends of the first IDT 11, wherein the first IDT 11 is divided into portions 11a and 11b in a direction perpendicular to the propagation direction of the SAWs (i.e. as in Applicant's Fig. 9 for example). Regarding claims 10 and 12, see Fig. 5 or Fig. 11 wherein the filter is series connected to another SAW resonator filter or SAW one-port resonators, respectively creating a communication device comprising the filter.

Allowable Subject Matter

12. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claim 3 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. § 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest a SAW filter having specifically recited combination of the "point-symmetry" recited in claim 1 and a divided IDT as recited in

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claim 3; or a SAW filter having the balanced and unbalanced terminal connections recited in claim 13 and a divided IDT as recited in claim 15.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kuroda JP 2001-313540 discloses a SAW filter with outer IDTs that are symmetrical with the center IDT and vertically inverted (see the abstract and Fig. 1 IDTs 12 and 14 are inverted).

Sawada JP 2001-308672 discloses a SAW filter 31 (Fig. 14) with inverted outer IDTs 31b and 31c.

Edmonson U.S. 6,255,915 discloses a SAW filter (lower filter in Fig. 4) with inverted outer IDTs 74 and 75 (see col. 5, lns. 27-55).

Dai et al. U.S. 5,790,000 and Saw et al. U.S. 5,835,990 are similar and discloses split center IDTs (i.e. having an even number of electrodes) connected to balanced terminals.

Hartmann et al. U.S. 6,268,782 also shows split center IDTs [see e.g. Fig. 7(a)].

16. Any inquiry concerning this communication should be directed to Barbara Summons at telephone number (703) 308-4947, FAX no. (703) 308-7724, receptionist's no. (703) 308-0956, Supervisory Examiner Bob Pascal (703) 308-4909.



Barbara Summons
Patent Examiner
Art Unit 2817

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February 26, 2003